Bilingual Booklets as a Learning Introduction Media to Natural Disaster Mitigation in Wetlands

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Abstract: This study aims to design and evaluate the effectiveness of a bilingual booklet (Indonesian and Banjarese) as a learning media for disaster mitigation in wetland areas of South Kalimantan. The research method used is Design-Based Research (DBR) with four main stages: problem identification, product development, product testing, and reflection. The study involved 50 elementary school students selected using purposive sampling. Data was collected through validation instruments by content, media, and language experts, as well as questionnaires for teacher and student responses. The results showed that the booklet achieved validation scores ranging from 80-100% and received positive responses from both students and teachers, with scores between 95.31%-100%. The booklet implementation in two phases showed an improvement in students' cognitive and affective understanding, analyzed using paired t-tests. The conclusion of this study is that the bilingual booklet is effective in enhancing students' knowledge of disaster mitigation, with practical implications for the development of disaster education media in disaster-prone areas.

Keywords: Bilingual; Booklet; Disaster mitigation; Education; Mitigation

Introduction

As an area in Indonesia that is dominated by wetlands, South Kalimantan often experiences annual natural disasters. In recent years, natural disasters that have occurred in South Kalimantan are floods, landslides, and peat fires. Natural disasters in South Kalimantan caused a lot of material and non-material losses that reached 216,266 billion rupiahs (Sumedi, 2021). For example, in 2021, the flood disaster in South Kalimantan experienced a sharp increase and was the largest disaster in the last 50 years, impacting material and non-material losses (Utama, 2021). Losses are reflected in infrastructure damage due to floods in South Kalimantan that occurred in 11 regencies/municipalities. There were at least 66,768 houses, 18,294 meters of roads, and 21 bridges damaged by floods (CNN Indonesia, 2021).

The high incidence of natural disasters in South Kalimantan is directly proportional to fatalities. In 2021, 21 victims died due to flooding, and 63,608 people were transferred to evacuation sites. In the same year, a landslide as a post-flood disaster also resulted in the death of 5 people, which occurred in Tanah Laut Regency, an area in South Kalimantan (Antara, 2021). The high number of fatalities and the value of losses that arise when a disaster occurs cause the lack of education on disaster mitigation in Indonesia, even though Indonesia is one of the most disaster-prone countries in the world (Haryanto et al., 2012). It is in stark contrast to what Japan is doing. After experiencing the Great East Japan Earthquake and Tsunami (GEJET) 2011, the Japanese realized the importance of a crisis management

system. They used two approaches, namely, teaching mitigation subjects during learning hours and conducting educational activities outside of subject hours (Nakasu et al., 2018; Tashiro et al., 2020). Moreover, the Japanese Government states to prepare its people in the face of disasters in the future.

The implementation of disaster mitigation education in Indonesia schools conducted by one researcher shows outstanding results regarding students' knowledge of natural disaster mitigation, with developments in the first cycle of 69% and an increase of 74% in the second cycle (Hayudityas, 2020). It can be evidence that mitigation education efforts can change students' knowledge of natural disaster mitigation, which will help students prepare themselves when a disaster occurs. Many researchers have carried out various studies on mitigation education related to ecological disasters. One of them is to instil the character of caring for the environment through habits to protect the environment (Jayawardana, 2016; Muhumuza, 2016). Mitigation education is also oriented to change and micro-social behaviour (Firmansyah, 2022). The implementation of mitigation education is also carried out using dissemination which can increase public understanding of disasters and add to existing relative disaster mitigation education (Jufriadi et al., 2012). In addition, other dissemination use education and training using the ethnoscience approach, namely using indigenous science related to environmental conservation, which ends with monitoring to monitor the sustainability of activities in schools (Jerie et al., 2011; Supriyadi et al., 2020).

Disaster mitigation is a response to disasters that emphasizes the need to study, respond and carry out activities after or before, during, and after a disaster occurs. To achieve disaster mitigation, students need information literacy skills related to disaster mitigation. Mitigation literacy information has been widely carried out by applying exciting learning media, such as comics, mobile applications, and videos (Mubarak et al., 2019; Wahyudi et al., 2022). The development of disaster mitigation content in the curriculum in schools is also the right step in combining learning and mitigation simulation activities, both at the early childhood education level to higher education (Nandi et al., 2019; Putra et al., 2021).

Based on several considerations on this background. Researchers try to combine the making of exciting learning media and develop the media based on the curriculum at school. The target of this research is elementary school students based on several studies that are still lacking in understanding disaster mitigation (Mustadi et al., 2020; Sakurai et al., 2018; Widyatmoko et al., 2011). Furthermore, in supporting efforts to increase knowledge related to natural disaster mitigation, the media developed by researchers is in the form of booklets. The use of booklets has a good impact in inculcating knowledge related to mitigation (Tawulo et al., 2019). However, to further enlarge the impact, the booklets are prepared using two languages, namely Indonesian and local languages (Banjarese), to make it easier for students to understand the contents of the developed booklet.

This study introduces the innovative use of bilingual booklets as learning media for disaster mitigation in elementary schools. The novelty of this research lies in the use of two languages, Indonesian and Banjarese, tailored to the characteristics of students in wetland areas. This research is crucial because disaster mitigation education is still under-implemented in Indonesian schools, despite the country being prone to natural disasters. By utilizing locally-based media, this study aims to enhance students' understanding and preparedness for disaster situations.

Method

Time and Location of Study: This study was conducted from August to December 2023 in two elementary schools in Banjarmasin, South Kalimantan (SDN Sungai Tandipah and SDN Basirih 6). Type of Study: The research is based on Design-Based Research (DBR), focusing on developing and evaluating learning products through an iterative process. Research Method: The study followed the Design-Based Research (DBR) method with four main stages: identifying the problem, developing the product (the bilingual booklet), testing the product, and reflecting on the results. Data Collection: Data was collected using the following instruments: expert validation sheets (content, media, language), teacher and student response sheets, and student tests on disaster mitigation knowledge. Data Analysis: Data analysis was conducted by calculating the percentage of validation and responses using a Likert scale of 1-5. Statistical analysis was performed using paired t-tests to compare the results of the first and second implementation phases.

Design-Based Research which refers to Reeves Model was used in this study, it consists of 4 main steps (Reeves, 2006). This step is depicted in Figure 1, where this research starts from identifying and analyzing problems through collaboration between researchers and practitioners. Furthermore, from these results, a bilingual booklet was developed based on the problem results. The next stage is a critical stage, namely the bear process for testing the booklet. The last stage is important, namely reflection on the implementation of the booklet so that a suitable booklet design is obtained in the introduction of natural disaster mitigation

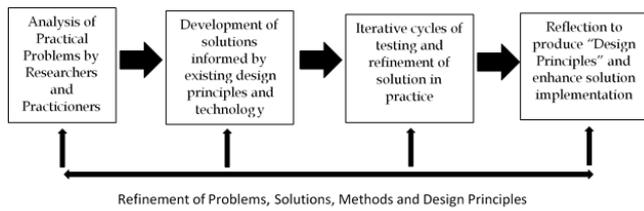according to the characteristics of students in South Kalimantan.

Figure 1. Design research approaches in educational technology research

The subjects in this study were Grade IV students at SDN Sungai Tandipah and SDN Basirih 6 Banjarmasin, totaling 50 students, selection of 50 students based on purposive sampling. Students are selected based on the domicile that tends to experience natural disasters.

The instrument used in this study consisted of 2 main types instruments. The first instrument is an instrument to analyze the feasibility of a bilingual booklet consisting of content expert validation sheet, media expert validation sheet, lan68guage expert validation sheet, teacher and student response sheets. Next is a test sheet that measures students' understanding of mitigation both cognitively and affectively. To support the main instrument, the researcher also made supporting instruments, in the form of interview guidelines for teachers and students to support the data obtained in the main instrument and as part of the reflection on each stage of the iterative process in implementing the booklet.

Data analysis was carried out for content expert validation sheets, media expert validation sheets, teachers and student's response sheets by calculating the percentage of answers using a Likert scale of 1-5. Each validation and response sheet contains bullet points related to the developed booklet. The results of each point are considered valid if they get a score > 70%. Furthermore, the revision of the booklet in terms of content and design was also carried out by researchers based on suggestions from content and media experts and written responses from teachers and students. The following data analysis is the analysis of students' understanding scores related to natural disaster mitigation in wetlands based on a test sheet to measure cognitive, and a questionnaire sheet to measure students' affective which is carried out in 2 implementation phases. The results obtained are then analyzed by t-test to determine whether there are differences in each implementation stage in the booklet's implementation.

Result and Discussion

Problem Analysis (Students' Initial Knowledge of Disaster Mitigation)

Measurement of students' prior knowledge of natural disaster mitigation in wetland areas is the basis for developing mitigation booklets. The results obtained will put a lot of emphasis on the parts that are considered importantly related to students' initial knowledge. The researcher has carried out this preliminary knowledge analysis (Annisa et al., 2022). An overview of the results obtained can be seen in Table 1.

Table 1. Students' Initial Knowledge of Disaster Mitigation

Question Indicator	Know (%)	Don't Know (%)
General knowledge regarding natural disasters in wetlands	61.98	38.02
Emergency response planning	53.16	46.84
Natural disaster warning	31.58	68.42
Mobilization of relief in natural disasters	32.68	67.32

Based on the data in table 1, the results show that only two aspects get a value above 50%. General knowledge aspects related to disaster knowledge of students get a percentage value of 63.31% and emergency response planning by 53.16%. In contrast to this aspect, the other two aspects get a percentage of <50% (related to disaster warnings and mobilization of aid in natural disasters). It indicates that students only know the type of disaster and its leading causes compared to disaster mitigation measures that will be carried out later. This data is undoubtedly a solid basis for developing a bilingual booklet that focuses more on natural disaster mitigation.

The aspect related to disaster warning getting a low percentage of scores related to student knowledge is disaster warning. The researcher notes that students do not know disaster warning codes, such as the use of bells or sirens at school. Ideally, schools need to provide knowledge related to disaster warnings, both in warning about an early warning or evacuation and rescue (Hidayati et al., 2010). In addition, students are also relatively low in their understanding of self-notification through shouting to indicate the location of the disaster rescue unit.

The next aspect that is still lacking in students' knowledge is the mobilization of help. The first thing that gets the spotlight, in this case, is the participation of students in disaster preparedness simulation activities. Based on the analysis results, students still very rarely participate in this activity. Simulation is an important activity that needs to be taught to students in disaster-prone areas. Several things need to be introduced,

primarily related to the types of disasters that often occur in the area, symbols/signs about disasters and evacuations, and preparedness procedures and procedures before, during, and after natural disasters (Arisona, 2020; Arisona et al., 2020). The low percentage of students who have been involved in disaster preparedness simulations has an impact on students' inadequate understanding of essential aspects of mitigation, for example, students' knowledge of natural disasters in their area. Another aspect is government actions and efforts to reduce the risk of natural disasters and know the equipment of disaster preparedness and mitigation facilities.

Content, Media and Language Expert Validation

After the bilingual booklet related to natural disaster mitigation in wetland areas was developed, the next stage was the expert's validation stage, which consisted of content validation, media design, and language. Validation needs to determine the quality of the booklets, both in terms of the accuracy of the material (breadth and depth according to the level of education), booklet design (cover and content design), and language (language use and accuracy).

For content expert validation, it is divided into two aspects, namely: content feasibility and presentation feasibility. These two aspects are further divided into several indicators. The results obtained from the material expert's assessment are described in Table 2. Based on the results of the material expert's validation of all the indicators assessed, the value ranges from 80 - 100%. The percentage generally indicates that the bilingual booklet related to natural disaster mitigation based on the quality of the material is excellent.

Table 2. Content Expert Validation

Indicators	Percentage (%)
Aspect of Content eligibility	
Completeness of content	80
Content breadth	100
Content depth	100
Concept and description accuracy	80
Accuracy of examples, facts and illustrations	100
Conformity with the development of science and technology	80
Relationships between concepts	100
Communication	100
Content attraction	100
Aspect of Eligibility Content Presentation	
Introductory Part	90
Contents Section	90
Closing Section	100

Assessment in terms of content is critical, considering that the booklet will disseminate to students. The material must be complete, broad and deep. In addition, it is also imperative to assess the accuracy and relevance of concepts, examples, facts, and illustrations. It forms a complete communication in presenting material in a booklet (Untung et al., 2024). In addition, because the booklet is also a medium that contains only essential points, the assessment of the material is beneficial, especially in seeing that the whole booklet is more directed to the main idea with concise, dense and easy-to-understand sentences for students (Sudjana et al., 2013).

The media expert's assessment includes three aspects, namely book size, skin design, and content design. Similar to the aspect of validation from a material expert, each aspect consists of several indicators. In general, the percentage of assessments from media experts for each element can be seen in Table 3. Similar to the evaluations of material experts, the range of values obtained on validation from media experts ranges from 80 - 100%. It indicates that it is excellent in terms of the feasibility of the booklet media. The highest percentage is the booklet size, and the suitability of the size with the content material gets a value of 100%. It indicates that the booklet has a balance of form and content format.

Table 3. Media Expert Validation

Indicator	Percentage (%)
Booklet Size	
Booklet size conformity with ISO standard	100
Compatibility of size with content material	100
Cover Design	
Layout	80
Typography	95
Use of fonts	100
Content design	
Content suitability	88
Layout harmony	80
Completeness of layout	92
Layout Comprehension	80
Content Typography	85
Content illustration	88

Based on the data in Table 3, the overall assessment results from media experts are in the range of 80 – 100%, so that the booklet design was not revised. The first aspect to look at is the suitability of the booklet size based on ISO standards and the material's content. The assessment of these two indicators gets a perfect score of 100%. The size of the self-developed booklet uses the standard A series size with A5 size with a size of 148 × 210 mm (Kuhn, 2006).

The next aspect of being assessed is the cover and content design. Assessment of this aspect is considered very important because all the elements in this section play an essential role in attracting students' interest in reading booklets, from the layout, typography, use of

letters, and illustrations used. The overall rating is excellent, with a range of 80 – 100% (for cover design) and 80 -92% (for content design). Designing a cover for a booklet is very important because the skin is the first thing the reader sees. Therefore, the cover design includes visuals and perceptions created in a single unit, which will later increase the reader's motivation and achieve the goals the author wants (Duro et al., 2012).

Based on this, the skin of the booklet that was developed was designed to integrate children's caricature images so that they are more able to attract students' interest in reading them (Figure 2). Besides the cover, content design is also essential to keep readers motivated to read. Therefore, the booklet contents are always arranged harmoniously between illustrations and words, as shown in Figure 2.

Figure 2. Booklet design

Furthermore, the assessment of linguists consists of 2 indicators. Indicators consist of the use and accuracy of language. The results of the evaluations from linguists can be seen in Table 4. The indicators assessed by linguists range from 80 – 80%. Appropriate language is an essential aspect of this bilingual booklet because local languages are the key to successful dissemination to students.

Table 4. Language Expert Validation

Indicator	Percentage (%)
Language use	100
Language Accuracy	100

Subsequent assessments from linguists include language use and language accuracy. The percentages can be seen in Table 5.4, where the value for language use is (80%), and language accuracy (88%). The use and accuracy of language are crucial in this booklet, considering that this booklet was designed using two languages, namely Indonesian and Banjarese. The concept of using two languages or bilingualism has been widely applied to several booklet developments. This will undoubtedly make it easier for booklets to be understood in specific communities and expand the readership of booklets (Preboth, 2000; Sahrain, 2017).

Teacher and Students' Responses

After the bilingual booklet related to mitigation has been validated by experts and revised based on advice from experts, the assessment continues to see user responses from both teachers and students. The results of the teacher's response to bilingual booklets related to mitigation are reviewed from several points, namely: repeatable, flexibility, understandable, independent, mobility, and the impact on activities student. From some of these things, the overall score can be seen in Table 5. Based on the teacher's response results, all indicators get a value of 100%. Based on this, it can be concluded that booklets can be used in the learning process based on the teacher's response.

Table 5. Teacher's Response

Indicator	Percentage (%)
Repeatable	100
Flexibility	100
Understandable	100
Independent	100
Mobility	100
Positive impact on students	100

Based on the students' responses, they are divided into several indicators according to the impact of bilingual booklets related to natural disaster mitigation on the learning process in the classroom. The indicators consist of the quality of the booklet content, the allocation of time for use, characters, grammar, readability, and motivation. The student responses ranged from 95.31 – 99.37%.

Table 6. Students' Response

Indicator	Percentage (%)
Content Quality	99.37
Allocation of time usage	97.5
Character	98.125
Grammar	97.5
Readability	97
Motivation	95.31

After being assessed by experts, the quality of the booklets needs to be evaluated based on the responses from the primary users, namely teachers and students. The teacher's assessment includes several things, such as the nature of the booklet, which provides for repeatable, flexible, understandable, independent, mobile, and its impact on students. A good booklet must have this trait because a booklet is a type of media that can be easily carried, and the contents are clear and concise. Moreover, content in the booklet does not cause multiple meanings and can be used repeatedly to strengthen the reader's understanding (Abrori et al., 2016; Ditunno et al., 1994). From this function itself, the value obtained is 100%, so that the bilingual booklet related to natural disaster mitigation has suitable characteristics to be used in the learning process.

Apart from its function, the teacher also assesses the booklet's potencies in impacting student activities because a good booklet not only provides information but can also help the reader in implementing the information in the booklet (Goodwin et al., 2001). This assessment by the teacher also gets a score of 100%, which means the booklet that will be developed later has excellent potential in increasing student activity in understanding natural disaster mitigation.

Student responses are also crucial in assessing the quality of the booklet. The indicators assessed included the quality of content, allocation of usage time, character, grammar, interests, and motivation from the students themselves. Content quality and time allocation are functional parts of the booklet. Assessment from this point of view is critical to see whether the booklet in terms of content and duration of use can be used optimally by students. A good booklet is a booklet that has concise but clear content, and the allocation of use in reading the information is no longer than textbooks, modules, and handouts because of their simple, flexible,

and mobile (Huth et al., 2003). The assessment results for each indicator get a percentage of 99.37% (content quality) and 97.5% (allocation of time of use). The results of these percentages indicate that functionally the booklet has had a good function according to the student's perspective.

Next, the character and grammar indicators are related to the booklet format. Character includes some of the properties of the booklet, such as independence and ease of use. Meanwhile, grammar is related to communication and the use of simple language (Abrori et al., 2016; Ditunno et al., 1994). The results obtained on this indicator are excellent, with 98.125% (for characters) and 97.5% (for grammar). These results indicate that the criteria are valid in terms of the booklet format.

The last indicator that is assessed is the interest and motivation related to the impact of the booklet on students. Booklets are also assessed based on their impact on the teacher's response. Meanwhile, from the student's perspective, the effect is seen from the personal view of the students themselves (Goodwin et al., 2001). The values obtained in interest and motivation are 97% and 95.31%, with valid criteria. It shows that the students' perspective also states the same thing as the teacher's response that booklets impact students' interests and motivation.

Impact of Booklet on Cognitive and Affective

Measurement of the impact of this bilingual booklet was carried out in 2 schools, namely SDN Basirih 6 and SDN Sungai Tandipah. Each school carried out the implementation process two times as one form of iteration. This is based on the characteristics of the design-based research is an iteration in product implementation to get a comprehensive conclusion on the strengths and weaknesses of the product that has been developed (Reeves, 2006). Based on this, measurements were made for implementations 1 and 2 to determine the difference in the results obtained.

Table 7. Description of Cognitive and Affective Scores in 2 Schools

		Mean	N	Std. Deviation	Std. Error Mean
					SDN Basirih 6
Cognitive	Implem_1	81.1354	28	6.25109	1.18135
	Implem_2	92.2161	28	4.21511	.79658
Affective	Implem_1	83.7857	28	5.17370	.97774
	Implem_2	87.8571	28	6.62047	1.25115
SDN Sungai Tandipah					
Cognitive	implem_1	82.0667	9	12.50670	4.16890
	implem_2	92.8778	9	11.00906	3.66969
Affective	implem_1	84.4444	9	7.40120	2.46707
	implem_2	91.3333	9	7.74597	2.58199

The table 7 shows descriptive statistics from the data on first implementation and second implementation at SDN Basirih 6 and SDN Sungai Tandipah. For SDN Basirih 6, it can be seen from the data that the average score of first implementation is 81.1354 and the average of second implementation is 92.2161, with standard deviations of 6.25109 and 4.21511. Meanwhile, for SDN Sungai Tandipah, the average score of first implementation was 82.0667, and second implementation was 92.8778, with a standard deviation of 12.5067 and 11.00906. Descriptively, it can be seen that there is a difference between first implementation and second implementation, both in terms of average score and standard deviation.

An interpretation is made on the paired samples correlation table to obtain essential data. Based on the data in the table 8, the results in the column related to the correlation coefficient value for cognitive aspect are 0.57 (for SDN Basirih 6) and 0.878 (for SDN Sungai Tandipah). Meanwhile, for affective aspect, SDN Basirih

6 got 0.877 and SDN Sungai Tandipah got 0.747. Next, the significant value for cognitive in the column sig obtained a value of 0.002 (for SDN Basirih 6), and 0.002 (for SDN Sungai Tandipah), which indicates that it is lower than the probability value of 0.05. The significance value is also the same in the affective aspect, where SDN Basirih 6 gets a value of 0.000 and SDN Sungai Tandipah is 0.021. The results of the overall significance value show that the data is below 0.05. This score means that there is a relationship between cognitive and affective values in the first and second implementations.

Table 8. Paired Samples Statistics

	N	Correlation	Sig.
SDN Basirih 6			
Cognitive	28	.570	.002
Affective	28	.877	.000
SDN Sungai Tandipah			
Cognitive	9	.878	.002
Affective	9	.747	.021

Table 9. Paired Samples Test

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
SDN Basirih 6								
Cognitive	-11.08076	5.17839	.97862	-13.08873	-9.07279	-11.323	27	.000
Affective	-4.07143	3.24241	.61276	-5.32870	-2.81415	-6.644	27	.000
SDN Sungai Tandipah								
Cognitive	-10.81111	5.98278	1.99426	-15.40988	-6.21234	-5.421	8	.001

The final step to determine the impact of the booklet is to measure the mean difference between the first implementation and the second implementation on cognitive and affective aspects in the two schools. Based on the data paired sample t-test in Table 9, in the sig (2-tailed) column, both the cognitive and affective aspects in 2 schools get a score of < 0.05. This score indicates a mean difference between cognitive and affective scores in the first and second implementations. These results indicate that the developed bilingual booklet impacts increasing cognitive and affective values. Several other studies have even shown that booklets directly impact the cognitive improvement of readers, because booklets can affect the reading habits of readers (Dawes et al., 2010; Sari, 2017). A good booklet plays a role in improving the reader's cognitive and can also increase the reader's affective. Several studies related to the application of booklets also stated that readers' affective increased after using booklets in dissemination activities (Chambers et al., 1997; Vahedi et al., 2012; et al., 2013).

Reflections on the Implementation of the Bilingual Booklet of Natural Disaster Mitigation

The final reflection is an essential part of design-based research to find the correct pattern for implementing booklets in the classroom. Based on the results obtained in the first implementation and second implementation of the booklet, it was concluded that there were differences in students' cognitive and affective values in the first implementation and second implementation in the two schools. It shows that at the end of each implementation activity, the researcher conducts a reflection process to improve the results obtained in the next implementation process. The following are the reflections made by researchers, which are described in Table 10.

The use of booklets not only focuses on cognitive and affective enhancement but also on improving the learning process related to disaster mitigation. Therefore, researchers at the end of each implementation always reflect and plan changes for the next implementation. In table 10, it can be seen that the reflection was made. When implementing the booklet, some changes in the learning process are adding video watching activities and simple simulations to further

improve students' understanding of disaster mitigation. Several studies have carried out the implementation of booklets by conducting simulations, and in general, they have had a good impact on increasing competence (Williams et al., 2019; Yasukawa et al., 2003). In addition, the use of a combination of videos and booklets is also excellent in providing an overview of the contents of the booklet (Howard et al., 2021).

Table 10. Activity Reflection

School	General description	Important things to note	Changes to be made in the next implementation
SDN Basirih 6	Students are enthusiastic about the booklet being distributed. The process of recognizing the types of disasters can be carried out properly. There are problems in introducing pre-disaster, during the disaster, and post-disaster activities.	To maximize students' knowledge and attitudes regarding pre, during, and post-disaster activities, it is necessary to have additional activities in classroom learning.	There were several changes that were formulated and implemented in the second implementation. Some of these are: Learning video viewing. A short simulation to teach students to do pre, during, and post-disaster activities
SDN Sungai Tandipah	The general description of the problem is almost similar to SD Basirih 6. Problems also occur when students read booklets, where students only focus on looking at pictures of booklets and do not absorb information in booklets.	There needs to be assistance in reading booklets so that students' knowledge of mitigation is more coherent. There are additional activities to improve understanding of the contents of the booklet	Changes in subsequent implementations are partly the same as SD Basarih 6, through video playback and short simulations. Furthermore, there is an addition from teacher assistance for booklet reading activities.

Conclusion

Initial knowledge of students related to disaster mitigation obtained an average percentage of student knowledge in the following aspects: general knowledge related to disasters by 63.31%, emergency response planning by 49.12%, disaster warning 31.55%, and mobilization of relief in natural disasters of 32.68%. The quality of the booklet based on the results of the material expert validation obtained a value with a value range of 80%-100%. Meanwhile, the validation results from media experts obtained the same results with the range for some indicators 80-100%. Moreover, the validation of the result from linguists ranges from 80-88%. From the teacher's response, the quality of the booklet was obtained 100%. Finally, the responses from students ranged from 95.31 - 99.37% with valid criteria. The impact of the booklet on student knowledge can be seen from the implementation of first and second stage, where the average value obtained is > 80. Meanwhile, there is an increase in the average value of the first and second implementation, and the data shows the difference in average mean based on paired sample t-test. The implementation of bilingual booklets on natural disaster mitigation in this study provides a comprehensive description that booklets can improve students' cognitive and affective aspects. The final product can be tested more widely in other schools through iterations. The results obtained can be used as a reference or comparison about the universal impact of this bilingual booklet. Further research can also translate this booklet into other regional languages to broaden the scope of booklet users. Therefore, this study successfully developed a bilingual booklet that proved effective in improving students' knowledge of disaster mitigation in wetland areas. The bilingual booklet showed positive impacts on enhancing students' cognitive and affective understanding. The practical implications include the use of easily understood and applicable learning media in disaster-prone areas. Future research can expand the scope of this booklet by testing its use in other regions with different disaster types, as well as translating it into other regional languages to broaden its impact.

Author Contributions
F. M. A., M. A., T. P., and HP. were responsible for the conceptualization of the research. The methodology was designed by F. M. A. Validation of the study was carried out by F. M. A., M. A., and T. P. R. A. E. performed the formal analysis and contributed to the investigation alongside M. A. The resources for the research were provided by T. P. and A. R. A. E. also handled the data curation. The original draft

preparation of the manuscript was completed by F. M. A. and T. P., while the writing—review and editing were managed by M. A. and F. M. A. Finally, the visualization of the study was created by R. A. E. All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest
The authors declare no conflict of interest.

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